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CLIMATE RISKS & PREPAREDNESS

ABESS CENTER FOR ECOSYSTEM SCIENCE & POLICY

A National Index of Floodplain Development to Guide Climate-Smart Growth and Land Use Management

USGCRP Observations Interagency Working Group
September 20, 2022

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NSF National Science Foundation

Project Overview

Limiting floodplain development is key to effective flood risk management

Motivating research questions:

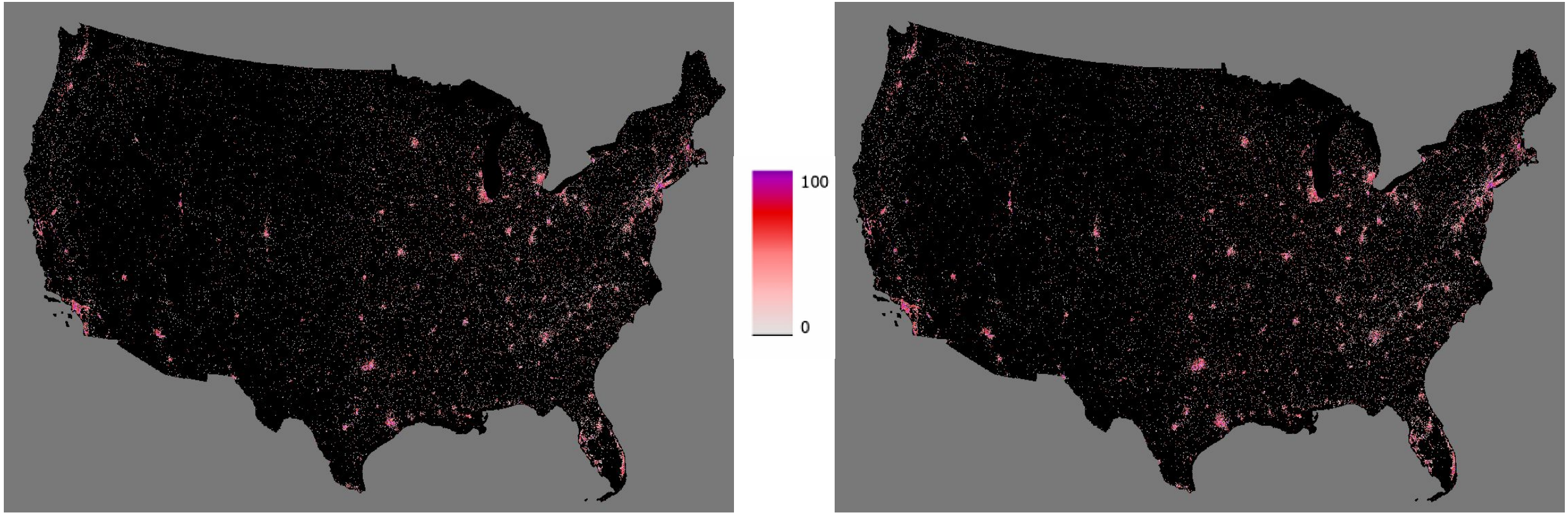
1) Where is **floodplain development** taking place?

2) How can we explain observed floodplain development outcomes? What is the role of **community characteristics** and **local floodplain policies**?

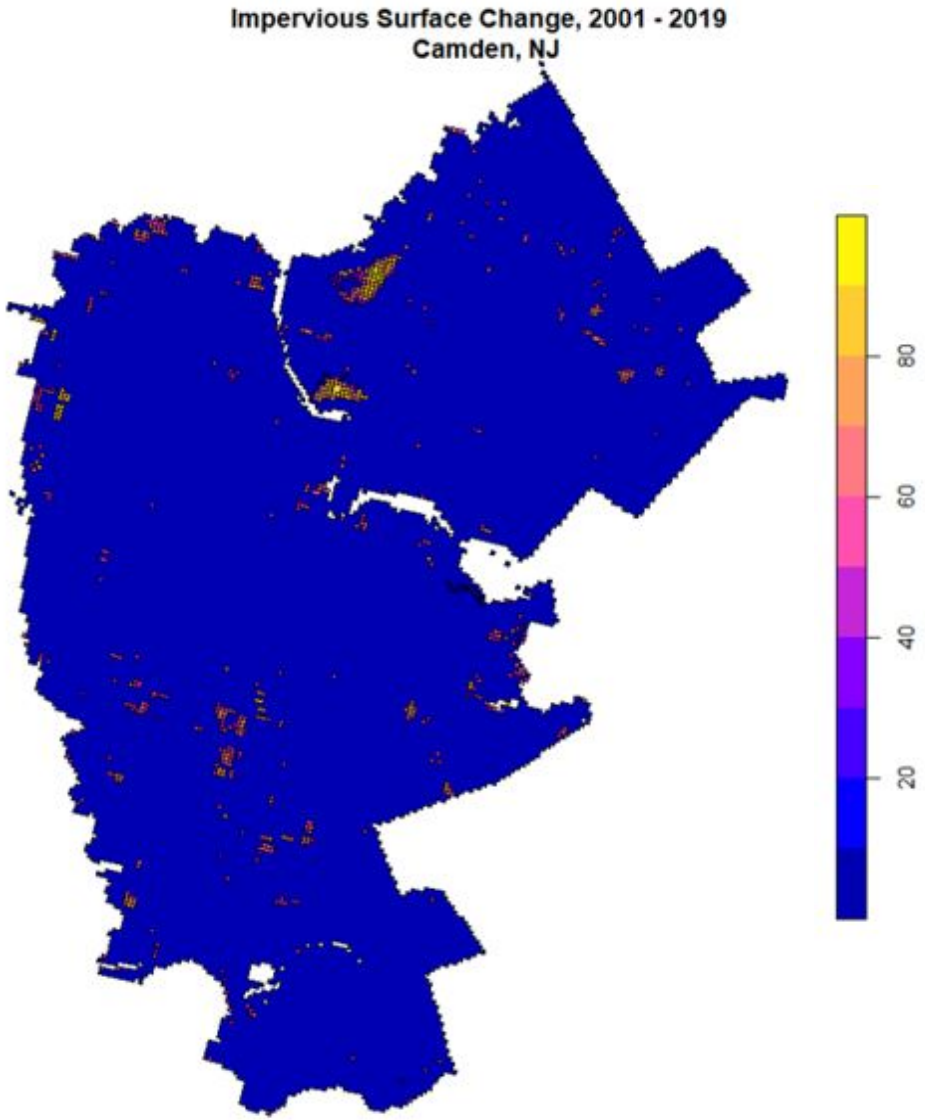
To answer these questions, we integrate remote sensing and social science methods

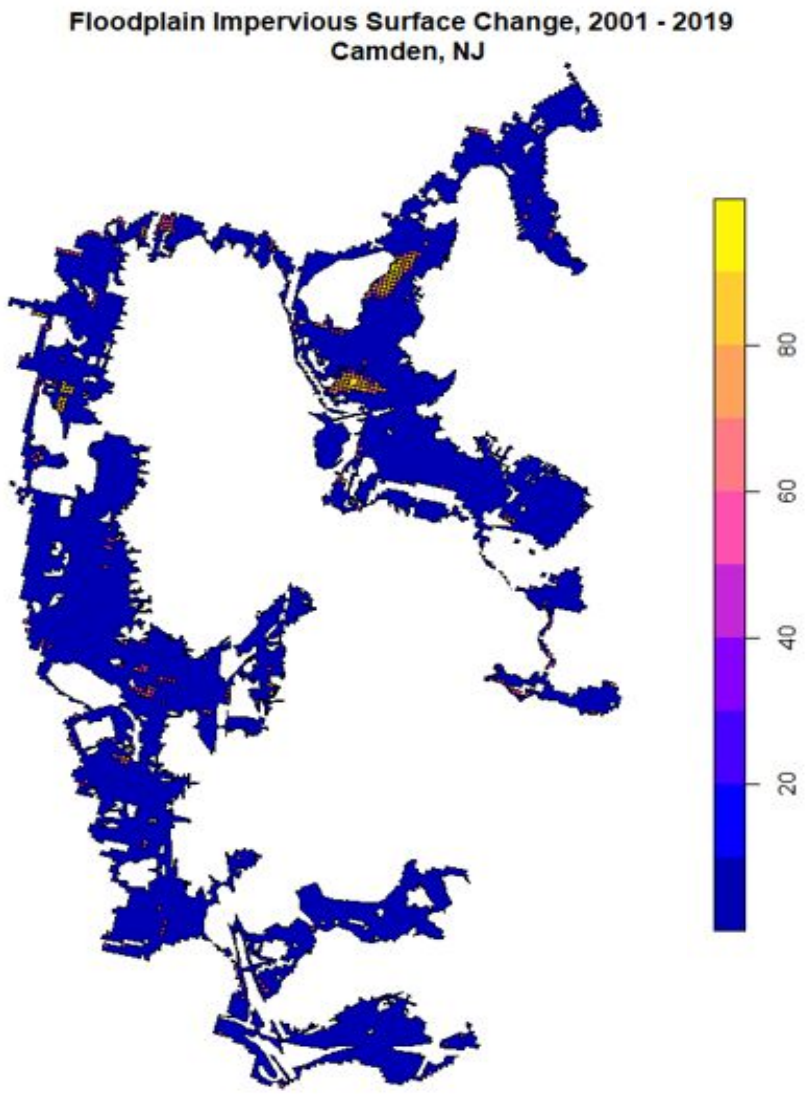
Where is floodplain development taking place?

Percent Urban Imperviousness – 2001 & 2019

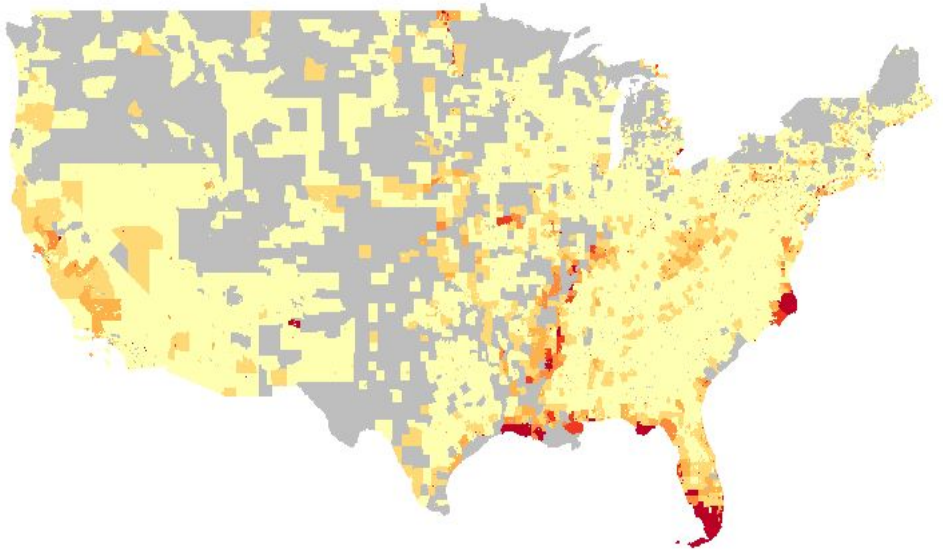


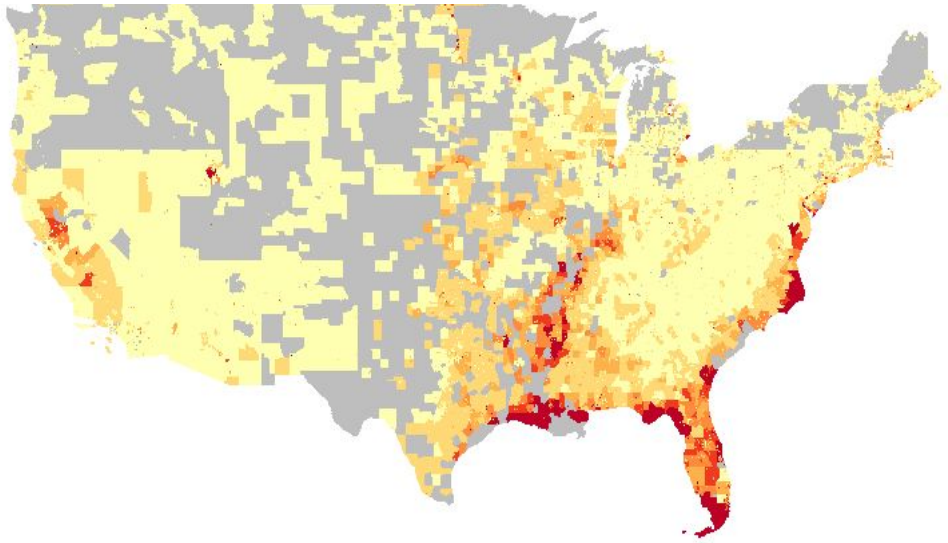
Measuring Floodplain Development

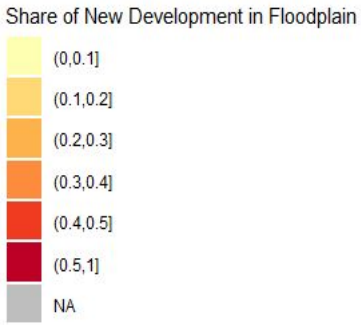


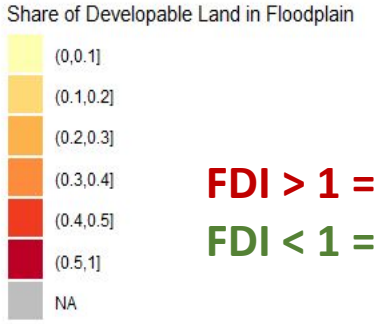


Calculating a Floodplain Development Index (FDI)









$$FDI = \frac{share\ of\ new\ development\ in\ floodplain}{share\ of\ developable\ land\ in\ floodplain}$$

FDI > 1 = concentrated floodplain development

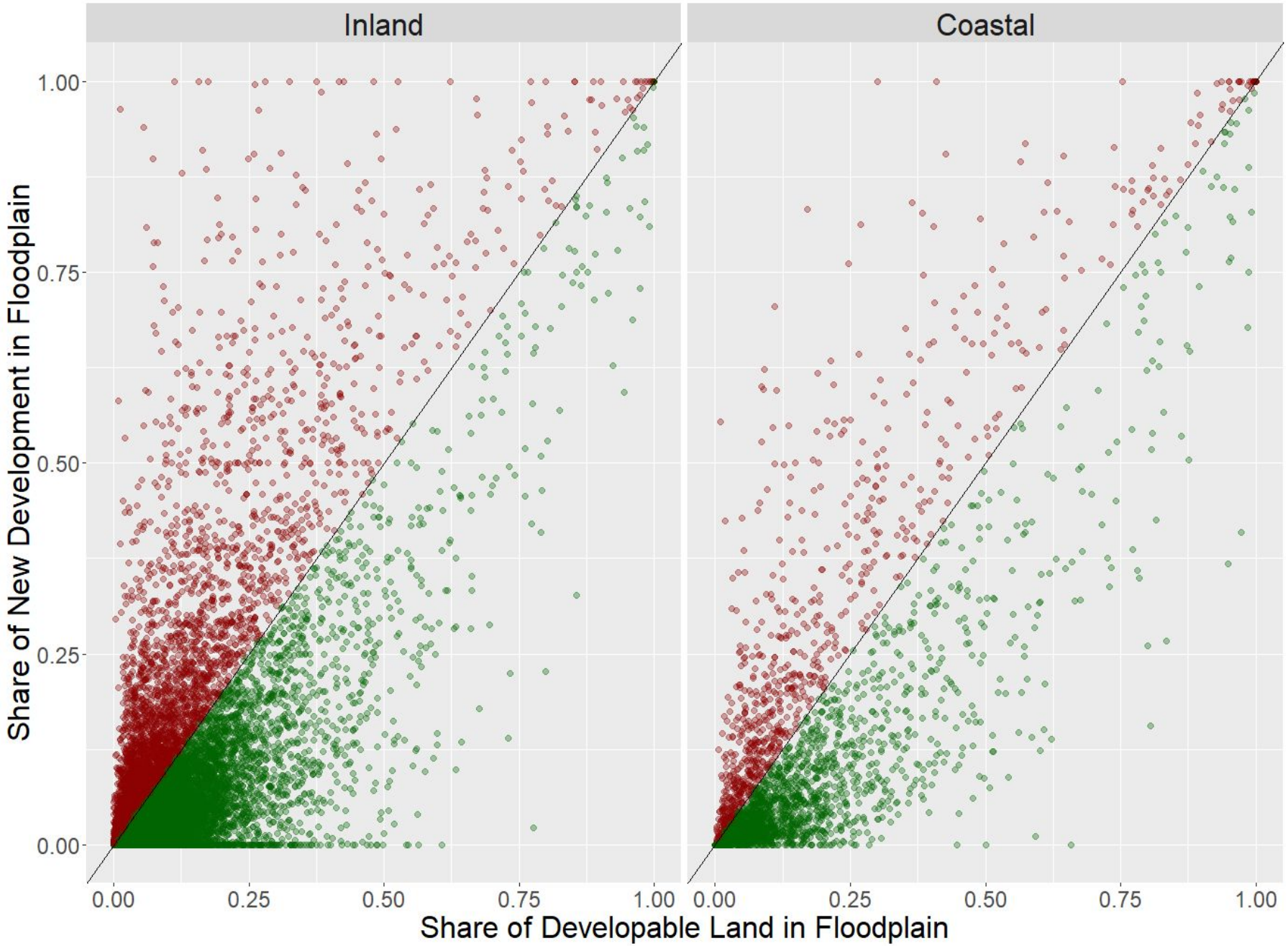
FDI < 1 = limited floodplain development

FDI: 26% of communities nationwide have concentrated development in the floodplain

How can we explain observed floodplain development outcomes? What is the role of community characteristics and local floodplain policies?

Focus on **3 variables**:
Geography, Wealth, Community Rating System (CRS)

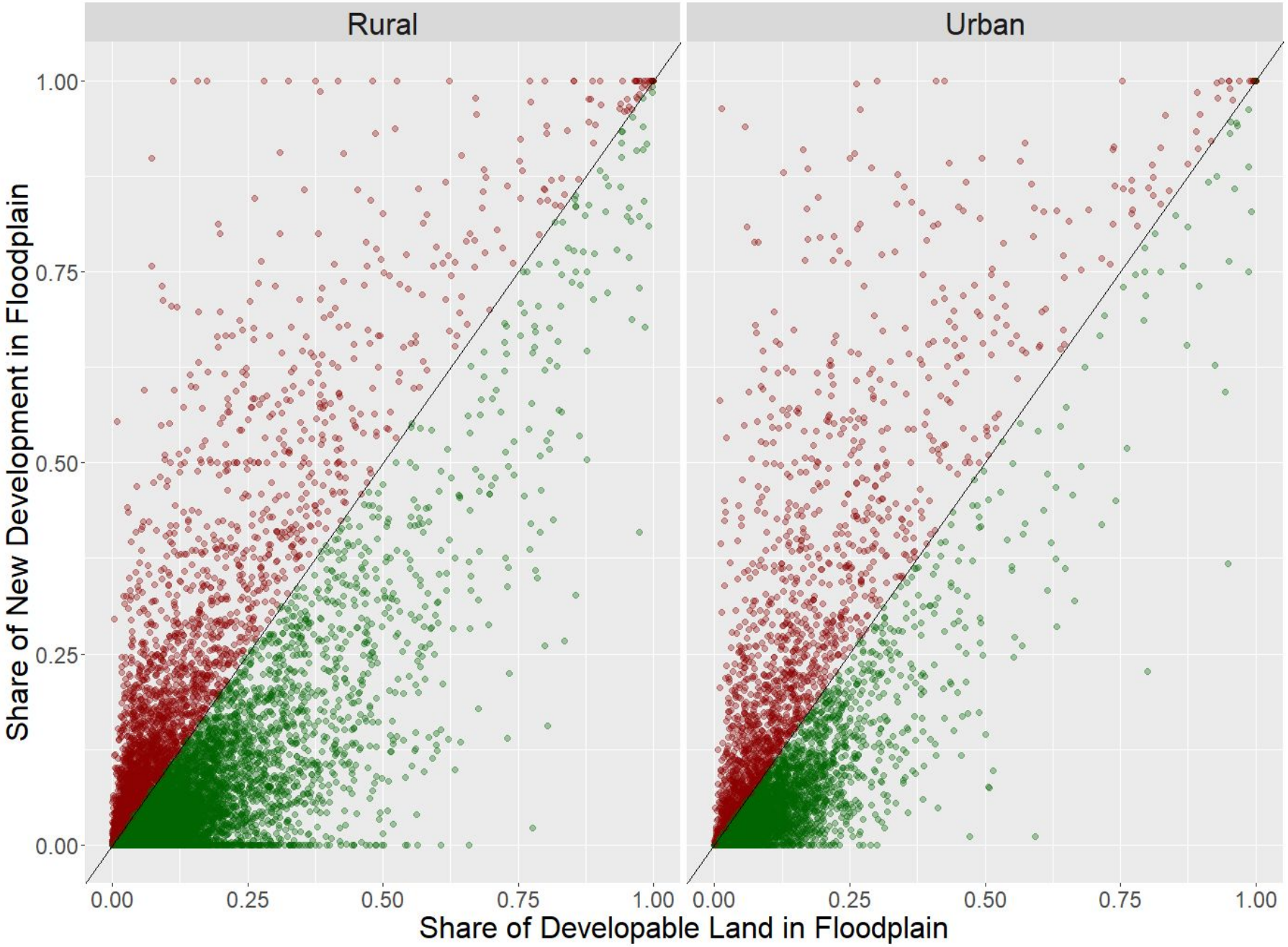
Geography: Coastal Communities have Higher Rates of Floodplain Development



Percent of communities with concentrated floodplain development:

Inland – 25.5% (n = 15,703)
Coastal – 29.3% (n = 2,844)

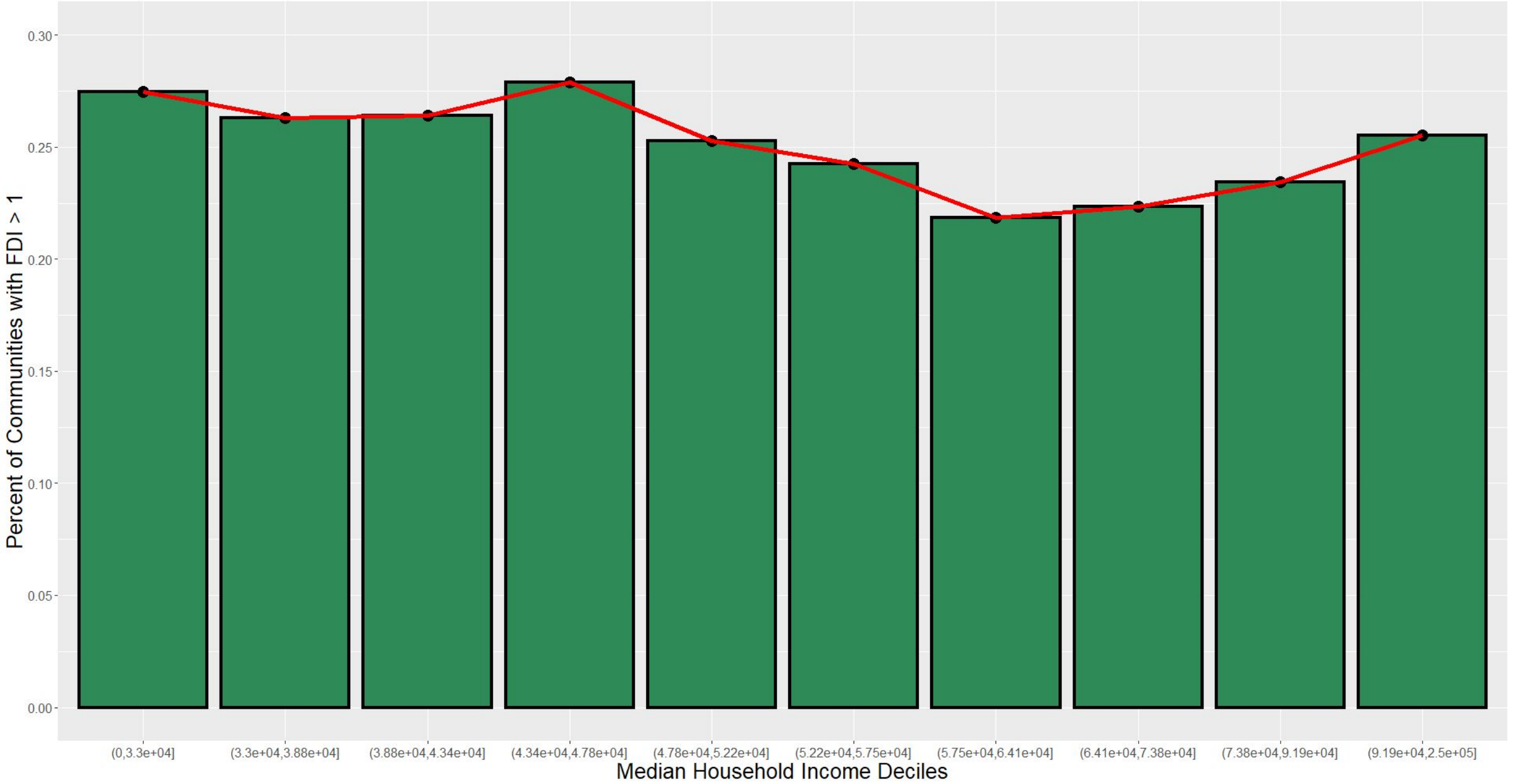
Geography: Urban Communities have Higher Rates of Floodplain Development



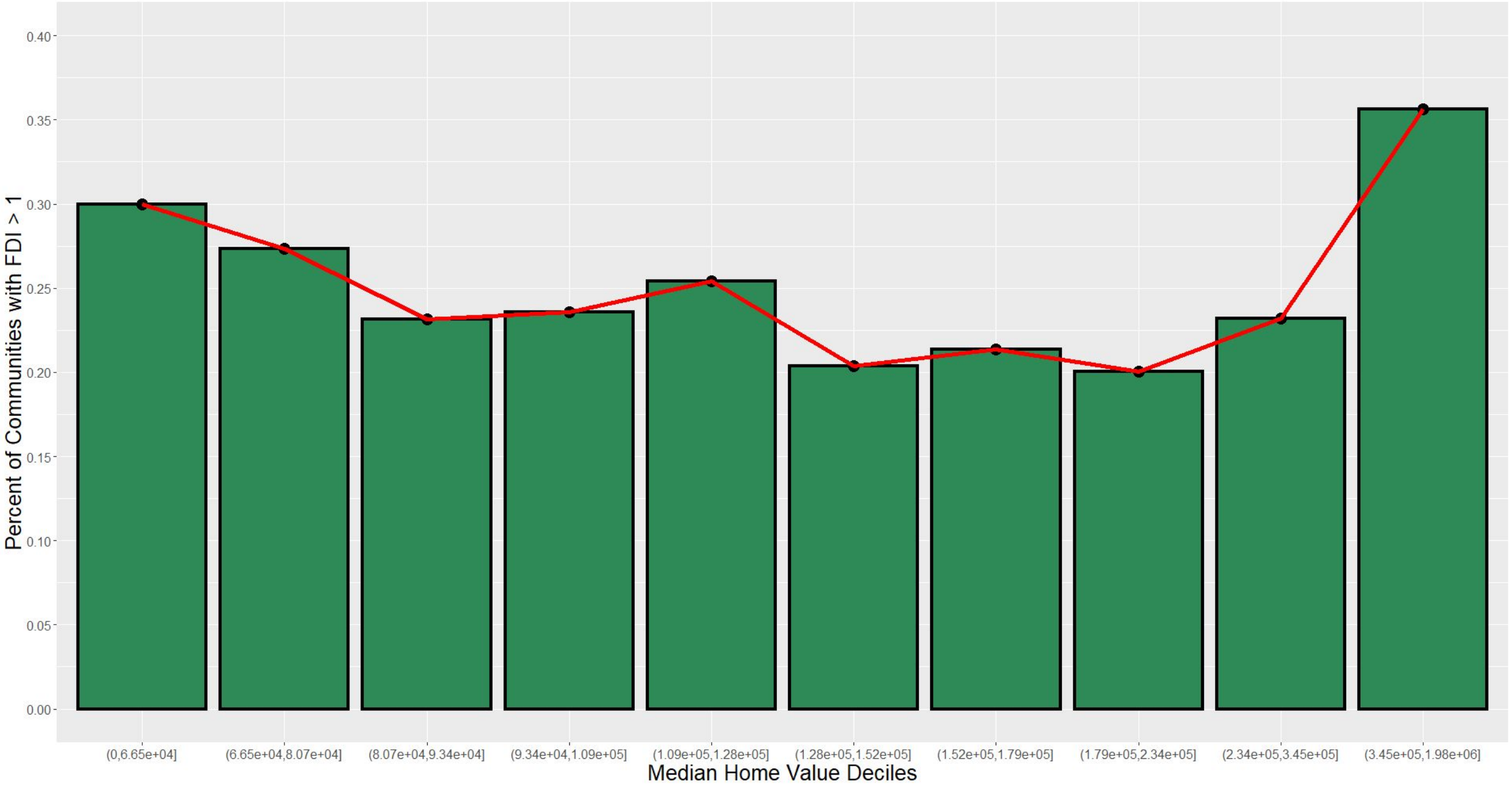
Percent of communities with concentrated floodplain development:

Rural – 25.1% (n = 12,307)
Urban – 28.0% (n = 6,240)

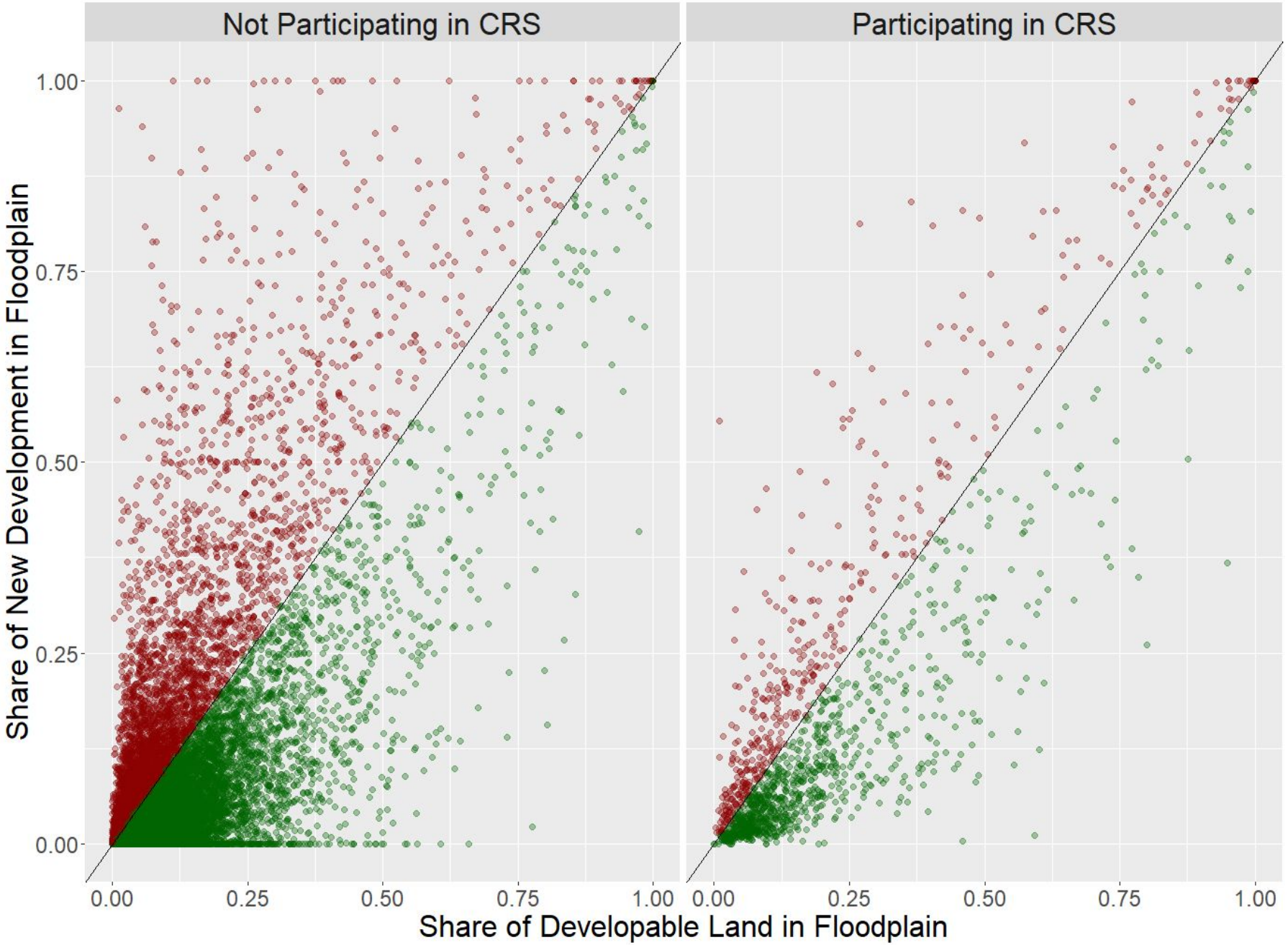
Wealth: W-Shaped Relationship between Floodplain Development and Income



Wealth: U-shaped Relationship between Floodplain Development and Home Value



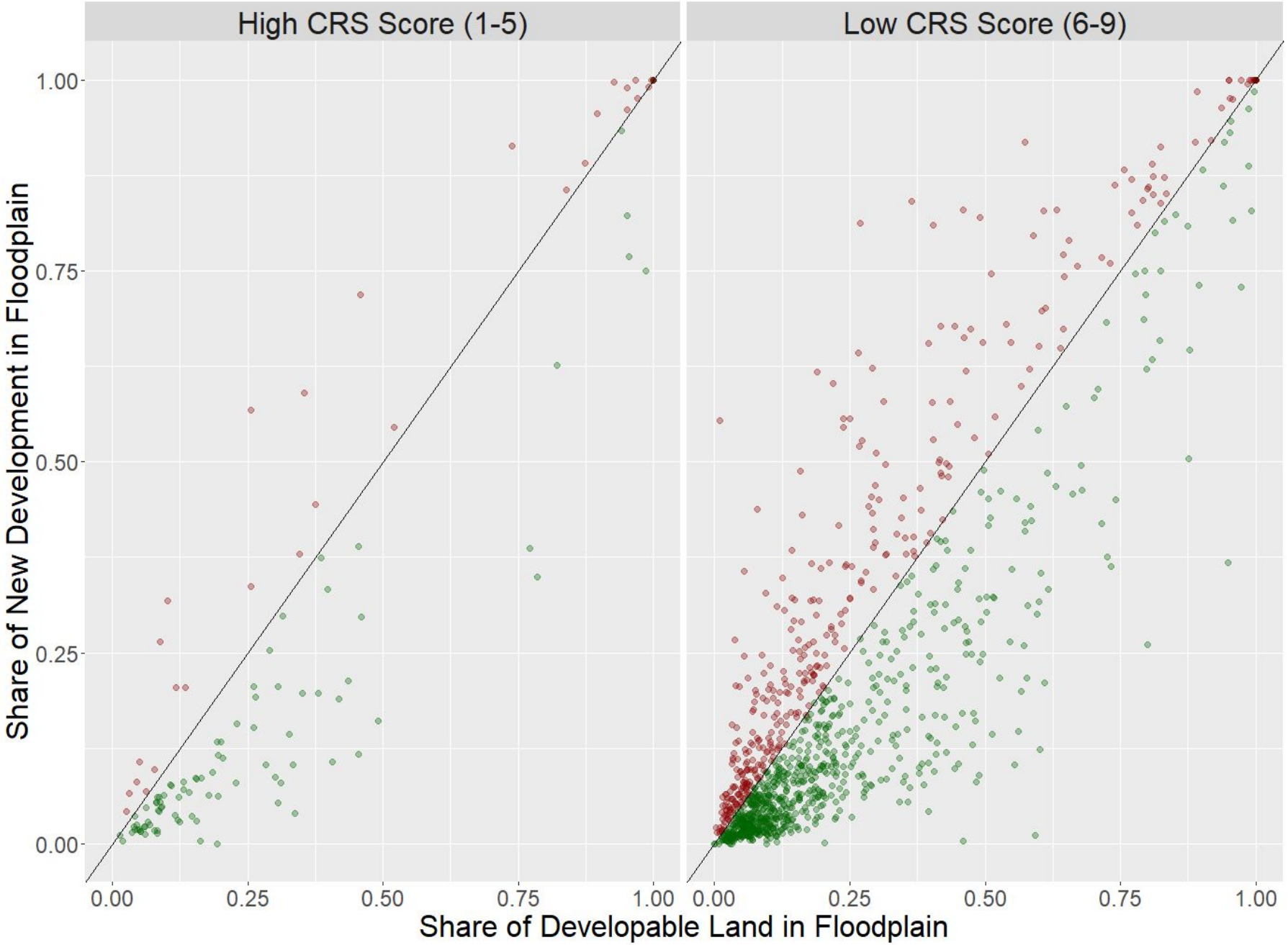
CRS: Participating Communities have Higher Rates of Floodplain Development



Percent of communities with concentrated floodplain development:

Not Participating – 25.5%
(n = 17,099)
Participating – 32.0%
(n = 1,449)

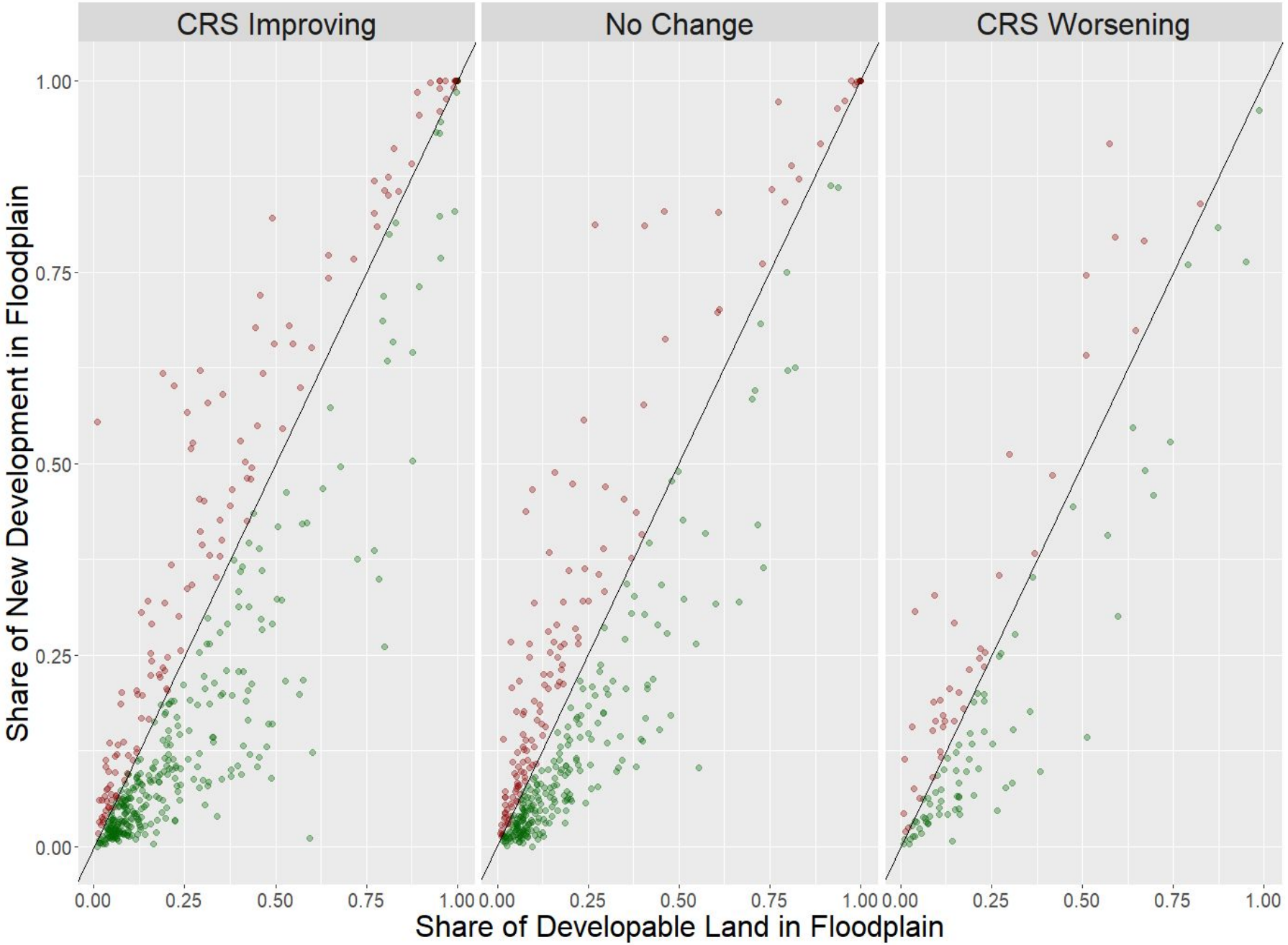
CRS: Low Scoring Communities have Higher Rates of Floodplain Development



Percent of communities with concentrated floodplain development:

High Score – 25.0% (n = 161)
Low Score – 32.3% (n = 1,334)

CRS: Improving Communities have Lower Rates of Floodplain Development



Percent of communities with concentrated floodplain development

Improving – 30.9% (n = 538)
No Change – 35.1% (n = 425)
Worsening – 36.0% (n = 137)

Case studies, starting in New Jersey

Purpose:

Connecting local floodplain policies to floodplain development outcomes

Process:

1) Community Selection
2) Document Review & Legal Analysis
3) Site Visits
4) Key Informant Interviews

Main Takeaways

1) Combining remote sensing and social science methods creates a robust approach to studying floodplain development—the “where” and “why”
2) Floodplain development outcomes vary by geography, wealth, & CRS
3) Local approaches to floodplain management are key to understanding overall patterns in floodplain development